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October 29, 1996

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

EX PARTE

Mr. James D. Schlichting
Chief, Competitive Pricing Division
Common Carrier Bureau
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: Federal-State Joint Board on Universal Service, CC Docket No. 96-45; Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98

Dear Mr. Schlichting:

Pursuant to your recent request, Southwestern Bell Telephone Company (SWBT) hereby provides information and analyses concerning the Hatfield Model (version 2, release 2), which has been submitted to the Commission in the above-reference rule making dockets. The analyses demonstrate in detail significant shortcomings of the Hatfield Model. Specifically, SWBT provides an analysis of structure assignment costs in the Hatfield Model and a sensitivity analysis of the Model for SWBT in Missouri.

Pursuant to Section 1.1206(a)(1) of the Commission's rules, 47 C.F.R. § 1.1206(a)(1), two copies of this letter and the analyses have been provided to the acting secretary of the Commission.

Should you have any questions concerning the foregoing, do not hesitate to contact me.

Sincerely,

Todd F. Silbergeld

Attachments

cc: Mr. William F. Caton, Acting Secretary

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SWBT ANALYSIS OF STRUCTURE ASSIGNMENT COSTS IN HATFIELD MODEL

The Hatfield Model allocates only 33% of the cost of poles , conduit and buried cable trenching cost to the telephone operations. The remaining 67% would theoretically be paid for by other utilities. This is based on the assertion in the Hatfield documentation that "plant structure (conduit, poles, and trenches) will be shared by several service providers. The structure assignment parameters in the Expense Module allow the user to vary the amount of structure investment for aerial, underground, and buried feeder and distribution facilities assigned to telephone users. The default value is 0.33 for all categories".[1] This calculation takes place in the Expense Module on the "Distribution" and "Feeder" worksheets. The "Structure fraction assigned to telephone" factors are found in cells F59 - H60 on the "Inputs" worksheet. They are shown separately for distribution and feeder.

Changing these factors from .33 to 1 increases the average loop cost per month for Southwestern Bell as shown below:

	Average Cost Per Loop		
	FCC Submission	With Correction	% Increase
Arkansas	$16.12	$19.98	24%
Kansas	$14.96	$19.38	30%
Missouri	$13.36	$17.30	29%
Oklahoma	$15.70	$20.10	28%
Texas	$11.87	$15.86	34%

The approach taken in the Hatfield model is unrealistic and not representative of most telephone companies operations. The poles, conduit and buried cable trenching are normally done by each company in a area. There are a number of reasons why the hypothetical arrangement under the Hatfield model would be impractical.

1. It is impractical to place power cable and telecommunications cable in close proximity to one another because of electrical field created by the power cable . This could cause "hum" on the telecommunications facilities for voice communication and make these facilities unusable for data transmission, such as PC\Internet use.

2. Even in the placement of facilities to new developments, the coordination necessary to 'share' the cost of placement among utilities/CATV is not readily accomplished because of the timing and availability of

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[1] Model Description, Hatfield Model, Version 2.2, Release 2, dated September 4, 1996, Page 36

construction crews to meet individual time frames, let alone combined time frames. Typically power facilities are placed as soon as lot lines, road/sidewalk easements are known. Telephone cable would be placed as the homes near completion and the cable TV would be placed after homes are occupied. Having the facilities in their own 'structures' also allows each "utility" to perform maintenance/repair of their own facility without undue risk of potential disruption of other utilities service as a result of damage to a common structure.

The more traditional way to deal with the shared use of facilities is through rental agreements, such as pole attachment arrangements and conduit rentals. In these arrangements, each company would install its own facilities and structure or they would place their facility in/on structures owned by another utility. The utility using another companies structure would pay the structure owner rent commensurate with the structure used. These arrangements are common for poles, less common for conduit and impractical for trenching.

Attached is a Sensitivity Analysis of the Hatfield Model for Southwestern Bell Telephone in Missouri. In addition to the specific structure allocation change, a number of other changes were made in the inputs to the Hatfield Model to be more consistent with SWBT Forward Looking Economic Cost Studies. The results show that with these changes the cost per loop increases by $14.83 from $13.26[2] to $28.09. Over half of the total increase, or $7.54, is associated with the correction of the structure allocation[3].

The other changes are explained in the attached analysis.

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[2] This amount ($13.26)is reflective of the information presented in interconnection arbitration proceedings in Missouri that are based on the Hatfield Model. The only difference from that information provided to the FCC is that the depreciation lives have been changed on the Missouri arbitration runs to reflect the last FCC depreciation represcription. SWBT has changed these lives in the Sensitivity Analysis to be more consistent with forward looking methodology.

[3] This change assigned 40% of poles, 100% of conduit and 100% of buried cable trenching to telephone.

Hatfield Model Sensitivity Analysis
Unbundled Loop Cost
Southwestern Bell Telephone Company - Missouri

Purpose of the Sensitivity Analysis

The monthly costs for unbundled loops calculated by the Hatfield model and Southwestern Bell Telephone (SWBT) cost studies are significantly different - $13.26 versus $22.75.[1] Differences in cost estimates are caused by two factors:

- *Differences in the structure of cost models.* These may include,
    - *Differences in costing methods* (e.g., computing plant costs per unit of maximum useable capacity versus per unit of expected, average utilization).
    - *Differences in cost elements* (e.g., including main distributing frame costs with end office switching costs versus loop costs).
    - *Differences in the type of source data* used for costing (e.g., pole and conduit resource costs versus factors which express pole and conduit investment relative to cable investment).
- *Differences in input (source data) to the cost models* (e.g., construction cost data, mix of plant types, plant fill factors and others.)

Sensitivity analyses typically are used to evaluate the effect of changes in input to a cost model on the model result. For example, the most important input values to a cost model can be identified by varying input values to the model, one at a time, and determining which input values cause the greatest change in the result.

Sensitivity analyses also can be used to isolate the effect of differences in input between two cost models. In this case, the input from one model is used in the other, preferably one at a time, to determine the effect of input value differences on model results.

If the two models produce the same or similar results, having modified all input to be the same, then it is reasonable to conclude any differences in the structure of the models are immaterial. If the models continue to produce significantly different results, differences in

[1] The unbundled loop monthly costs include loadings for "common costs." The Hatfield model cost includes a loading of 10% of direct costs for "variable overheads." The SWBT cost includes a loading of 16.47% of direct costs for prospective joint and common costs. One of the sensitivity analyses determines the change in the Hatfield model cost from substituting SWBT's 16.47% loading for Hatfield's 10% loading.

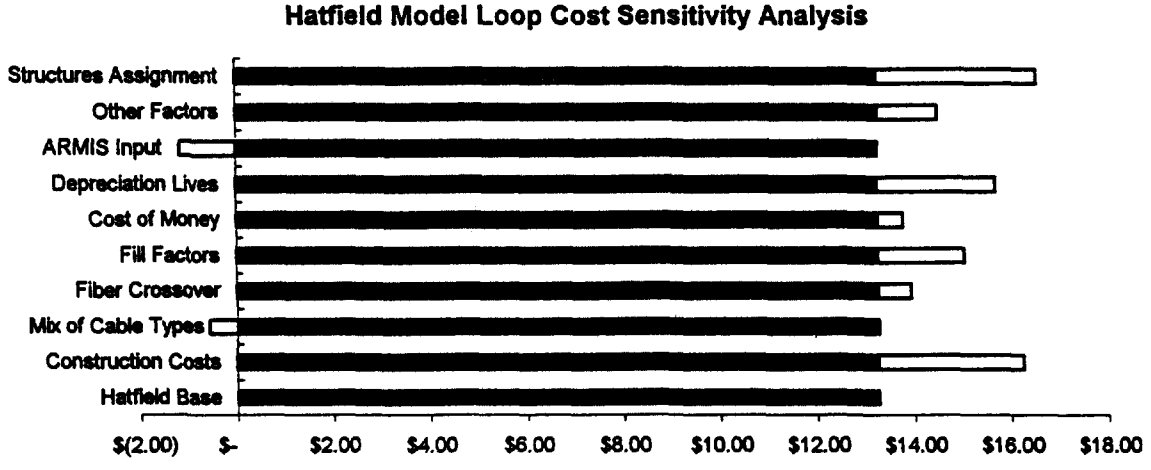
model structure are significant. Changes in the structure of one model would have to be made to identify the effect of structural differences on model results. Structural changes, though, may not be practical depending on the size and complexity of the cost models.

The sensitivity analyses of the Hatfield model have three purposes: First, to determine (to the extent possible) the effect on loop costs of using SWBT input data in the Hatfield model. Secondly, to identify the most important differences in input values. Third, to conclude whether significant structural differences in the Hatfield and SWBT models remain which cause differences in cost estimates.

Results of Sensitivity Analyses

Nine sensitivity analyses were run on the Hatfield model. The results are illustrated below in Figure 1. Exhibit 1 summarizes the results of the individual sensitivity analyses and the effect of changing the inputs on a cumulative basis. Exhibit 2 provides some detail of the effects of the various changes on the components of the unbundled loop (Loop Distribution, Loop Concentration, and Loop Feeder by major categories of cost). Exhibit 3 shows where the changes in input values were made for the sensitivity analysis by the shaded areas on the 'User Input' worksheet and the 'ARMIS Expense' worksheet.

Figure 1



Hatfield Base

The bottom bar in Figure 1 represents the result of the Hatfield model before any changes to model input. The monthly loop cost is $13.26. Each bar above the Hatfield Base represents the results of one of the nine sensitivity analyses.

Construction Costs

A key input to the calculation of monthly loop costs is the cost of material, equipment, labor, etc. used to construct loop facilities. The four most important categories of construction cost input for loops are *cable costs per foot, buried cable placement labor costs, pole and conduit cost data,* and *digital loop carrier cost data.*

SWBT and Hatfield input values for the first two - cable costs per foot and buried cable placement costs - are similar and were not changed in the sensitivity analysis. Pole and conduit cost data and digital loop carrier cost data are significantly different between the models. SWBT cost data for these categories were substituted for Hatfield model data. Other construction cost data, such as serving area interface (SAI) also were changed.

The result of this sensitivity analysis was to increase the Hatfield model monthly loop cost from $13.26 to $16.26. This is primarily due to SWBT's corrected digital loop carrier construction cost data.

Mix of Cable Types

In this sensitivity analysis, the proportions of prospective aerial, buried and underground cable plant were changed in the Hatfield model to those used by SWBT. For distribution cable, there was a reduction in the use of aerial cable and increases in buried and underground cable. For feeder cable, aerial cable also was decreased. The effect was to slightly decrease the monthly loop cost.

Fiber Crossover Distance

The length of fiber cable where fiber plant (and digital loop carrier) is used rather than copper plant was changed from 9,000 feet to 15,000 feet used by SWBT. All other input being the same, this raises the monthly loop cost by $0.68. However, when both SWBT's higher digital loop carrier equipment costs and mix of cable types are used, the effect of extending the crossover distance to 15,000 feet is to lower monthly loop costs by $0.27. (See Figure 2.)

Fill Factors

Hatfield fill factors for distribution cable and digital loop carrier systems were modified to yield the same effective utilization levels as used in the SWBT study. Although feeder cable fill factors can be modified in the Hatfield model, it was not possible to compute the effective utilization for feeder cable in the Hatfield model.

Consequently, it was not possible to adjust feeder cable fill to match the SWBT value. Lowering fill factors for distribution cable and digital loop carrier systems to SWBT levels raises the Hatfield monthly loop cost by $1.79 or 13%.

Cost of Money

Hatfield model values for debt ratio, cost of debt and the cost of money were changed to those used by SWBT. Since SWBT's cost of money figure for Missouri regulatory purposes is slightly higher than the Hatfield model (10.69% versus 10.01%), the effect was to raise monthly loop costs by $0.56 from $13.26 to $13.79, or 4%. For the Model to be used in the interstate jurisdiction, further adjustments would be necessary to reflect the FCC authorized cost of money as identified below:

	HATFIELD	FCC
Debt Percent	42%	44.2%
Cost of Debt	7.7%	8.8%
Cost of Equity	11.9%	13.2%

Depreciation Lives

The Hatfield model uses plant service lives for cable and wire facilities and circuit equipment which are longer than those expected by SWBT. In addition, the Hatfield model does not recognize net salvage values for cable and wire facilities. To adjust the Hatfield model input, the depreciation lives were all recomputed to produce the same depreciation rate as the economic lives with net salvages expected by SWBT. These lives then were substituted for those in the Hatfield model. The result of this correction was to increase monthly loop costs by $2.45 or 18%.

ARMIS Input[2]

Two adjustments were made to the ARMIS investment and expense input to the Hatfield model. First, *embedded* investments were restated on a higher, *current* cost basis. Since network expenses are computed based on the ratio of expenses to investment, this had the effect of lowering network expense factors and the resulting network expenses. The second adjustment was to eliminate the effect of the compensable property adjustment, which in many cases increased Missouri's ARMIS reported expenses. This is necessary because that while the expense,

[2] ARMIS Inputs (and other loading factors) were adjusted to reflect the differences in the development of Annual Cost Factors.

return amd tax amounts are charged to the benefitting stat, the investment remains on the host state's reports. Thus, any ratio (i.e. network expense factors) developed with an investment in the denominator must eliminate the compensable property adjustment from the numerator.[3] The net result of these two adjustments was to lower the Hatfield monthly loop cost from $13.26 to $12.10.

Other Factor

Several other loading factors were adjusted to levels comparable to those used by SWBT. One of the most important changes was to increase the "variable overhead" factor from 10% to 16.47%. This increases the level of common costs allocated to the monthly loop cost. The effect of all other factor changes was to increase the loop cost by $1.25.

Structures Assigned to Telephone

Input to the Hatfield model was changed to reflect that no conduit or buried cable placement costs are attributed to other utilities. The portion of aerial cable attributed to other utilities was reduced from 67% to 60% to reflect the amount of poles used in SWBT's study. These changes result in a substantial increase in monthly loop costs - from $13.26 to $16.57.

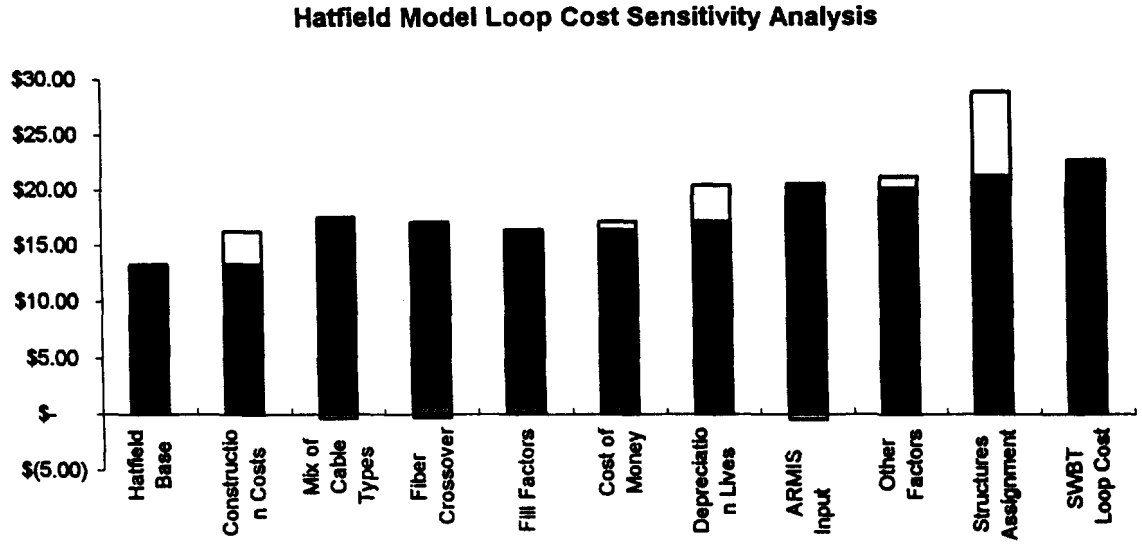
Cumulative Effects of Changes in Model Input

Figure 2 shows the effect on the Hatfield monthly loop costs of accumulating the effects of each of the nine changes described above. In some cases, such as the fiber crossover distance, there is some interaction between this change and other changes. The cumulative sensitivity analysis captures these effects. The effect of making all nine changes to the Hatfield model would be to raise the monthly cost from $13.26 to $28.09.

It should be understood that the effect of two or more individual changes can not be determined from the sum of the individual effects. This is due to the many interactions of the variables and the calculations within the model. If changes other than those included in this analysis are to be made they should be input into the model and run to determine the effect.

[3] Missouri expense amounts on the ARMIS reports are net of transfers to other states for expenses and capital costs on plant in Missouri used to provide services to other states. Since capital cost transfers are charged to expense accounts, the effect is to lower the expense amounts below the level of actual expenses to repair and maintain associated plant. In some cases, expense account balances actually are negative. The Hatfield study does not recognize this.

Figure 2



Differences in the Structure of the Cost Models

Since the cumulative result of the sensitivity analyses ($28.09) is substantially different from SWBT's monthly cost estimate $22.75 (including joint and common costs), this indicates there are significant structural differences in the models.[4] Some of these include the way in which distribution cable distances are calculated, the method for computing poles and conduit investment, the exclusion of the main distributing frame from loop costs in the Hatfield model, and the way in which premises termination investment is calculated.

Conclusions

Based on the nine sensitivity analyses, the most significant input value differences between the SWBT and Hatfield models *for loop costs* appear to be in the areas of construction costs, especially digital loop carrier costs, the fiber crossover distance, depreciation lives, and the assignment of structures investment to other utilities. Beyond these differences in input, there are significant differences in model structure which contribute to differences in loop costs.

[4] $22.75 = $19.53 loop cost X (1 + 16.47% joint and common cost allocation).

HATFIELD MODEL SENSITIVITY ANALYSIS
UNBUNDLED LOOP COST
MISSOURI

CHANGE	User Input Worksheet Line Numbers	Individual Changes		Cumulative Change *		
		Loop Cost	Difference	Loop Cost	Incremental Difference	Cumulative Difference
Base Hatfield Run		$13.26	$0.00	$13.26	$0.00	$0.00
1. Construction Cost Related	55 77 - 168, 196 - 216, 245 - 272, 300 - 332, 345 - 375, 377 - 384, 386 - 389, 395 - 435, 439 - 455, 462 - 567	$16.26	$3.00	$16.26	$3.00	$3.00
2. Mix of Cable Types	173 - 194, 221 - 242, 277 - 298, 456 - 458	$12.70	($0.56)	$15.87	($0.39)	$2.61
3. Fiber crossover distance	391	$13.94	$0.68	$15.60	($0.27)	$2.34
4. Fill Factors	60 - 73, 376, 385	$15.05	$1.79	$15.89	$0.29	$2.63
5. Corrected Cost of Capital	32 - 36	$13.79	$0.53	$16.64	$0.75	$3.38
6. Corrected Depreciation Lives	17 - 29	$15.71	$2.45	$19.95	$3.31	$6.69
7. Adjustments to ARMIS Input	'ARMIS Expense' worksheet changes	$12.10	($1.16)	$19.50	($0.45)	$6.24
8. Loading Factor Corrections	41 - 44, 47, 48, 51, 52	$14.51	$1.25	$20.55	$1.05	$7.29
9. % Structure Assigned to Telephone Correction	335 - 342, 438	$16.57	$3.31	$28.09	$7.54	$14.83

NOTES: * THE CUMULATIVE CHANGE CAN NOT BE DETERMINED BY SUMMING THE AMOUNT OF CHANGE ASSOCIATED WITH INDIVIDUAL CHANGES DUE TO THE INTERACTIONS OF THE CHANGED VARIABLES.

Exhibit 1

Hatfield Model Sensitivity Analysis
Unbundled Loop Costs
Missouri

Total Lines 2,808,994

	Hatfield Base	Construction Costs	Mix of Cable Types	Fiber Crossover Distance	Fill Factors	Cost of Money	Depreciation Lives	Adjusted ARMIS Input	Other Factors	Structures Assigned Telephone
Loop Distribution (Including NID)										
Investment	$ 879,780,672	$ 882,719,988	$ 959,174,128	$ 879,780,672	$ 1,030,807,014	$ 879,780,672	$ 879,780,672	$ 879,780,672	$ 879,780,672	$ 1,207,328,260
Capital Costs	$ 124,281,226	$ 124,696,446	$ 135,496,653	$ 124,281,226	$ 145,615,792	$ 132,707,330	$ 152,594,441	$ 124,281,226	$ 122,734,754	$ 170,551,867
Network Expenses	$ 75,153,506	$ 77,597,024	$ 48,621,044	$ 75,581,367	$ 95,175,021	$ 75,153,506	$ 75,153,506	$ 55,297,482	$ 75,153,506	$ 78,526,565
Support Expenses	$ 57,192,639	$ 45,475,411	$ 56,304,516	$ 55,747,509	$ 65,821,419	$ 58,386,765	$ 59,740,098	$ 48,804,636	$ 63,242,042	$ 61,847,121
Variable Overheads	$ 25,662,738	$ 24,776,888	$ 24,042,221	$ 25,561,011	$ 30,661,223	$ 26,624,760	$ 28,748,805	$ 22,838,334	$ 43,008,161	$ 31,092,755
Total Annual Costs	$ 282,290,109	$ 272,545,769	$ 264,464,434	$ 281,171,113	$ 337,273,455	$ 292,872,361	$ 316,236,850	$ 251,221,678	$ 304,138,463	$ 342,020,308
Monthly Cost / Loop	$ 8.37	$ 8.09	$ 7.85	$ 8.34	$ 10.01	$ 8.69	$ 9.38	$ 7.45	$ 9.02	$ 10.15
Loop Concentration										
Investment	$ 267,390,327	$ 710,438,569	$ 267,390,327	$ 104,346,722	$ 294,487,027	$ 267,390,327	$ 267,390,327	$ 267,390,327	$ 267,390,327	$ 267,390,327
Capital Costs	$ 46,763,457	$ 124,247,440	$ 46,763,457	$ 18,249,028	$ 51,502,355	$ 46,905,370	$ 67,950,669	$ 46,763,457	$ 46,350,879	$ 46,763,457
Network Expenses	$ 4,109,299	$ 10,926,533	$ 4,109,299	$ 1,626,702	$ 4,527,109	$ 4,109,299	$ 4,109,299	$ 4,124,892	$ 8,402,068	$ 4,109,299
Support Expenses	$ 16,254,441	$ 32,325,125	$ 16,721,524	$ 5,593,752	$ 16,846,731	$ 16,530,188	$ 20,811,925	$ 14,400,889	$ 19,680,602	$ 13,278,889
Variable Overheads	$ 6,712,720	$ 16,749,910	$ 6,759,428	$ 2,546,948	$ 7,287,619	$ 6,954,486	$ 9,287,189	$ 6,528,924	$ 12,259,205	$ 6,415,164
Total Annual Costs	$ 73,839,917	$ 184,249,008	$ 74,353,708	$ 28,016,430	$ 80,163,814	$ 76,499,343	$ 102,159,082	$ 71,818,162	$ 86,692,754	$ 70,566,809
Monthly Cost / Loop	$ 2.19	$ 5.47	$ 2.21	$ 0.83	$ 2.38	$ 2.27	$ 3.03	$ 2.13	$ 2.57	$ 2.09
Loop Feeder										
Investment	$ 359,668,904	$ 391,049,840	$ 395,659,074	$ 610,399,417	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 648,115,258
Capital Costs	$ 50,822,029	$ 55,256,226	$ 55,907,521	$ 86,250,817	$ 50,822,029	$ 54,288,317	$ 66,384,787	$ 50,822,029	$ 50,183,696	$ 91,580,150
Network Expenses	$ 11,317,158	$ 11,370,539	$ 5,090,467	$ 24,459,821	$ 11,447,828	$ 11,317,158	$ 11,317,158	$ 8,973,414	$ 11,317,158	$ 12,922,245
Support Expenses	$ 20,586,146	$ 16,364,948	$ 20,249,779	$ 35,299,892	$ 19,406,192	$ 21,236,304	$ 23,387,671	$ 17,234,627	$ 22,927,896	$ 28,250,193
Variable Overheads	$ 8,272,533	$ 8,299,171	$ 8,124,777	$ 14,601,053	$ 8,167,605	$ 8,684,178	$ 10,108,961	$ 7,703,007	$ 13,905,415	$ 13,275,259
Total Annual Costs	$ 90,997,865	$ 91,290,884	$ 89,372,544	$ 160,611,583	$ 89,843,654	$ 95,525,957	$ 111,198,577	$ 84,733,077	$ 98,334,165	$ 146,027,847
Monthly Cost / Loop	$ 2.70	$ 2.71	$ 2.65	$ 4.76	$ 2.67	$ 2.83	$ 3.30	$ 2.51	$ 2.92	$ 4.33
Total Loop										
Investment		$ 1,984,208,397	$ 1,622,223,529	$ 1,594,526,811	$ 1,684,962,945	$ 1,506,839,903	$ 1,506,839,903	$ 1,506,839,903	$ 1,506,839,903	$ 2,122,833,845
Total Annual Costs	$ 447,127,891	$ 548,085,661	$ 428,190,686	$ 469,799,126	$ 507,280,923	$ 464,897,661	$ 529,594,509	$ 407,772,917	$ 489,165,382	$ 558,614,964
Monthly Cost / Loop	$ 13.26	$ 16.26	$ 12.70	$ 13.94	$ 15.05	$ 13.79	$ 15.71	$ 12.10	$ 14.51	$ 16.57

Exhibit 2

	B	C	D	E
8	**State**		*Missouri*	
9	Company 1		*RBOC*	
10	Company 2			
11	Company 3			
12				Variable
13	Input Name	Default	Inputs	Name
14				
15	**Cost of Capital Factors**			
16	***Depreciation Lives***			
17	Loop Distribution	20		DistLife
18	Loop Feeder	20		FeedLife
19	Loop Concentrator	10		ConcLife
20	Wire Center	37		WireLife
21	End Office Switching	14.3		EOLife
22	Tandem Switching	14.3		TandLife
23	Transport Facilities	19		TransLife
24	Operator Systems	8		OpLife
25	STP	14		STPLife
26	SCP	14		SCPLife
27	Links	19		LinkLife
28	Public Telephones	9		PubLife
29	General Support	7		GenLife
30				
31	***Cost of Capital***			
32	Debt Percent	45.00%		DebtP
33	Cost of Debt	7.70%		DebtCost
34	Cost of Equity	11.90%		EquityCost
35	*Equity Percent*	*55.00%*		
36	*Overall Cost of Capital*	*10.01%*		
37				
38				
39	**Misc Expense Factors**			
40				
41	Variable Overhead Factor	10.00%		VarOvhd
42	Federal Income Tax Rate	40.00%		FITRate
43	Other Taxes Factor	5.00%		OtherTax
44	Operating State and Local Income Tax Fa	1.00%		StateIT
45	Billing/Bill Inquiry per line per month	$1.22	$1.22	Billing
46	Directory Listing per line per month	$0.15	$0.15	Directory
47	Forward-Looking Network Operations Fac	70.00%		NetOps
48	Central Office Switching Expense Factor	2.69%		COSwitch
49	End Office Traffic-Sensitive Fraction	70.00%	70.00%	EOTraffic
50	per-line Monthly LNP Cost	$0.25	$0.25	LNP
51	alternative CO switching factor	0.0269		ACOSF
52	alternative circuit equipment factor	0.0153		ACEF
53	Carrier-carrier customer service per line p	$1.56	$1.56	CarCar
54	NID expense per line per year	$3.00	$3.00	NIDExp
55	Swithc line circuit offset per DLC line	$35.00		CircOffs
56				
57	**Fill Factors**			

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
58	Cable			
59	*Feeder*			
60	0-5	0.65	0.65	Feeder0
61	5-200	0.75	0.75	Feeder5
62	200-650	0.80	0.80	Feeder200
63	650-850	0.80	0.80	Feeder650
64	850-2550	0.80	0.80	Feeder850
65	2550+	0.80	0.80	Feeder2550
66				
67	*Distribution*			
68	0-5	0.50		Dist0
69	5-200	0.55		Dist5
70	200-650	0.60		Dist200
71	650-850	0.65		Dist650
72	850-2550	0.70		Dist850
73	2550+	0.75		Dist2550
74				
75	**EO Switching Parameters**			
76				
77	Busy hour call attempts, residential	1.3	1.3	BHCAR
78	Busy hour call attempts, business	3.5	3.5	BHCAB
79	Switch Maximum Line Size	100,000	100,000	MaxLines
80	Switch Maximum Line Fill	0.8	0.8	MaxLineFill
81	Switch Maximum Processor Occupancy	0.9		MaxProc
82	Processor Feature Loading Multiplier	1	1	FeatureMult
83	Switch Installation Multiplier	1.1		InstallMult
84				
85	*Switch Parameters*			
86	Switch real-time limit, BHCA			
87	1 - 1,000	10,000	10,000	BHCA1
88	1,000 - 10,000	50,000	50,000	BHCA2
89	10,000 - 40,000	200,000	200,000	BHCA3
90	40,000+	600,000	600,000	BHCA4
91				
92	Switch traffic limit, BHCCS			
93	1 - 1,000	10,000	10,000	BHCCS1
94	1,000 - 10,000	50,000	50,000	BHCCS2
95	10,000 - 40,000	500,000	500,000	BHCCS3
96	40,000+	1,000,000	1,000,000	BHCCS4
97				
98	*Switch cost points*	lines		
99	Low line size	2,782		LowSize
100	Mid line size	11,200		MidSize
101	High line size	80,000		HighSize
102		cost/line		
103	Low line size	$220.00		LowCost
104	Mid line size	$86.00		MidCost
105	High line size	$59.00		HighCost
106				

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
107	Residential Holding Time Multiplier	1.00	1.00	resHT
108	Business Holding Time Multiplier	1.00	1.00	busHT
109	Busy Hour fraction of daily usage	0.10	0.10	BHF
110	Annual to daily usage reduction factor	270.00		UsRed
111				
112	**Interoffice and Tandem Parameters**			
113				
114	Operator Traffic Fraction	0.02		OpFrac
115	Total Interoffice Traffic Fraction	0.65		InterFrac
116	Direct-Routed Fraction of Local Interoffice	0.98		DirectFrac
117	Maximum Trunk Occupancy, CCS	27.5		TrunkCCS
118	Trunk Termination Investment, per end	$100		TermInv
119	Average Direct Route Distance, miles	10		Miles
120	Average Trunk Usage Fraction	0.3	0.3	TrunkFrac
121				
122	*Toll traffic inputs*			
123	Tandem-routed % of total intraLATA traffic	0.2		tandLATA
124	Average direct intraLATA route distance, m	25		LATAdist
125	Tandem-routed % of total interLATA traffic	0.2		tandAccess
126	Average direct access route distance, mi.	15		Accessdist
127				
128				
129	*Tandem Switching parameters*			
130	real time limit, BHCA	1,500,000	1,500,000	tandBHCA
131	port limit, trunks	120,000		portlimit
132	common equipment investment	$1,000,000		tandcominv
133	maximum trunk fill	0.8	0.8	maxtrunkfill
134	maximum real time occupancy	0.9		tandmaxocc
135	common equipment intercept factor	0.25		tandintercept
136				
137	**Wire Center Parameters**			
138				
139	Lot size, multiplier of switch room size	2	2	LotSize
140	Tandem/EO wire center common factor	0.4	0.4	WCcomm
141				
142	*Power and frame investment*	sum of power & frame		
143	0	$10,000		PF1
144	1,000	$20,000		PF2
145	5,000	$40,000		PF3
146	25,000	$100,000		PF4
147	50,000	$500,000		PF5
148				
149	*Switch Room size table*	floor area required		
150	0	500	500	Room1
151	1,000	1,000	1,000	Room2
152	5,000	2,000	2,000	Room3
153	25,000	5,000	5,000	Room4
154	50,000	10,000	10,000	Room5
155				

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
156	*Construction costs, per sq ft*	construction/$/sq ft		
157	0	$75		Const1
158	1,000	$85		Const2
159	5,000	$100		Const3
160	25,000	$125		Const4
161	50,000	$150		Const5
162				
163	*Land price, per sq ft*	price/sq ft		
164	0	$5.00	$5.00	Land1
165	1,000	$7.50	$7.50	Land2
166	5,000	$10.00	$10.00	Land3
167	25,000	$15.00	$15.00	Land4
168	50,000	$20.00	$20.00	Land5
169				
170	**Distribution Structure Inputs**			
171				
172	*Aerial Fraction*			
173	0-5	0.5		distaerial1
174	5-200	0.5		distaerial2
175	200-650	0.5		distaerial3
176	650-850	0.5		distaerial4
177	850-2550	0.4		distaerial5
178	2550+	0.65		distaerial6
179				
180	*Buried Fraction*			
181	0-5	0.5		distbur1
182	5-200	0.5		distbur2
183	200-650	0.5		distbur3
184	650-850	0.5		distbur4
185	850-2550	0.5		distbur5
186	2550+	0.05		distbur6
187				
188	*Underground Fraction*			
189	*0-5*	*0*		*distug1*
190	*5-200*	*0*		*distug2*
191	*200-650*	*0*		*distug3*
192	*650-850*	*0*		*distug4*
193	*850-2550*	*0.1*		*distug5*
194	*2550+*	*0.3*		*distug6*
195				
196	*Buried Installation/foot*			
197	0-5	$2.00	$2.00	distburinv1
198	5-200	$2.00	$2.00	distburinv2
199	200-650	$2.00	$2.00	distburinv3
200	650-850	$3.00	$3.00	distburinv4
201	850-2550	$3.00	$3.00	distburinv5
202	2550+	$20.00	$20.00	distburinv6
203				
204	*Conduit Installation/foot*			

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
205	0-5	$25.00	$25.00	distcondinv1
206	5-200	$25.00	$25.00	distcondinv2
207	200-650	$25.00	$25.00	distcondinv3
208	650-850	$25.00	$25.00	distcondinv4
209	850-2550	$45.00	$45.00	distcondinv5
210	2550+	$70.00	$70.00	distcondinv6
211				
212	Pole spacing, feet	150	150	distpolespace
213	Pole investment	$450	$450	distpoleinv
214	Conduit investment per foot	$1.00	$1.00	distcondinv
215	Manhole investment, per manhole	$3,000		distmanhinv
216	Buried cable armoring multiplier	1.1	1.1	distarmormult
217				
218	**Copper Feeder Structure Inputs**			
219				
220	*Aerial Fraction*			
221	0-5	0.5		cufeedaerial1
222	5-200	0.5		cufeedaerial2
223	200-650	0.5		cufeedaerial3
224	650-850	0.4		cufeedaerial4
225	850-2550	0.1		cufeedaerial5
226	2550+	0.05		cufeedaerial6
227				
228	*Buried Fraction*			
229	0-5	0.45		cufeedbur1
230	5-200	0.45		cufeedbur2
231	200-650	0.45		cufeedbur3
232	650-850	0.4		cufeedbur4
233	850-2550	0.1		cufeedbur5
234	2550+	0.05		cufeedbur6
235				
236	*Underground Fraction*			
237	*0-5*	*0.05*		*cufeedug1*
238	*5-200*	*0.05*		*cufeedug2*
239	*200-650*	*0.05*		*cufeedug3*
240	*650-850*	*0.2*		*cufeedug4*
241	*850-2550*	*0.8*		*cufeedug5*
242	*2550+*	*0.9*		*cufeedug6*
243				
244	*Buried Installation/foot*			
245	0-5	$2.00	$2.00	cufeedburinv1
246	5-200	$2.00	$2.00	cufeedburinv2
247	200-650	$2.00	$2.00	cufeedburinv3
248	650-850	$3.00	$3.00	cufeedburinv4
249	850-2550	$3.00	$3.00	cufeedburinv5
250	2550+	$25.00	$25.00	cufeedburinv6
251				
252	*Conduit Installation/foot*			
253	0-5	$25.00	$25.00	cufeedcondinv1

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
254	5-200	$25.00	$25.00	cufeedcondinv2
255	200-650	$25.00	$25.00	cufeedcondinv3
256	650-850	$25.00	$25.00	cufeedcondinv4
257	850-2550	$45.00	$45.00	cufeedcondinv5
258	2550+	$75.00	$75.00	cufeedcondinv6
259				
260	*Manhole Spacing, ft.*			
261	0-5	800		cufeedman1
262	5-200	800		cufeedman2
263	200-650	800		cufeedman3
264	650-850	800		cufeedman4
265	850-2550	600		cufeedman5
266	2550+	400	400	cufeedman6
267				
268	Pole spacing, feet	150	150	ufeedpolespace
269	Pole investment	$450	$450	cufeedpoleinv
270	Conduit investment per foot	$1.00	$1.00	cufeedcondinv
271	Manhole investment, per manhole	$3,000		cufeedmanhinv
272	Buried cable armoring multiplier	1.1	1.1	ufeedarmormul
273				
274	**Fiber Feeder Structure Inputs**			
275				
276	*Aerial Fraction*			
277	0-5	0.35		fibfeedaerial1
278	5-200	0.35		fibfeedaerial2
279	200-650	0.35		fibfeedaerial3
280	650-850	0.2		fibfeedaerial4
281	850-2550	0.1		fibfeedaerial5
282	2550+	0.05		fibfeedaerial6
283				
284	*Buried Fraction*			
285	0-5	0.6		fibfeedbur1
286	5-200	0.6		fibfeedbur2
287	200-650	0.6		fibfeedbur3
288	650-850	0.6		fibfeedbur4
289	850-2550	0.1		fibfeedbur5
290	2550+	0.05		fibfeedbur6
291				
292	*Underground Fraction*			
293	*0-5*	*0.05*		*fibfeedug1*
294	*5-200*	*0.05*		*fibfeedug2*
295	*200-650*	*0.05*		*fibfeedug3*
296	*650-850*	*0.2*		*fibfeedug4*
297	*850-2550*	*0.8*		*fibfeedug5*
298	*2550+*	*0.9*		*fibfeedug6*
299				
300	*Buried Installation/foot*			
301	0-5	$2.00	$2.00	fibfeedburinv1
302	5-200	$2.00	$2.00	fibfeedburinv2

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
303	200-650	$2.00	$2.00	fibfeedburinv3
304	650-850	$3.00	$3.00	fibfeedburinv4
305	850-2550	$3.00	$3.00	fibfeedburinv5
306	2550+	$20.00	$20.00	fibfeedburinv6
307				
308	*Conduit Installation/foot*			
309	0-5	$25.00	$25.00	fibfeedcondinv1
310	5-200	$25.00	$25.00	fibfeedcondinv2
311	200-650	$25.00	$25.00	fibfeedcondinv3
312	650-850	$25.00	$25.00	fibfeedcondinv4
313	850-2550	$45.00	$45.00	fibfeedcondinv5
314	2550+	$70.00	$70.00	fibfeedcondinv6
316				
316	*Manhole Spacing, ft.*			
317	0-5	2,000		fibfeedman1
318	5-200	2,000		fibfeedman2
319	200-650	2,000		fibfeedman3
320	650-850	2,000		fibfeedman4
321	850-2550	2,000		fibfeedman5
322	2550+	2,000		fibfeedman6
323				
324	Buried cable armoring per foot, fiber	$0.20	$0.20	ibfeedarmormul
325				
326	**Misc Loop Investment Inputs**			
327				
328	Drop investment per line	$40.00		dropinv
329	NID investment per line	$30.00		NIDInv
330	Terminal and splice per line	$35.00		SpliceInv
331	Average lines per business location	4	4	BusLinesLoc
332	Feeder structure fraction shared w/ interof	0.25	0.25	FeedShare
333				
334	*Distribution structure % assigned to telephone*			
335	aerial	0.33		AirDistTel
336	buried	0.33		BurDistTel
337	underground	0.33		UgDistTel
338				
339	*Feeder structure % assigned to telephone*			
340	aerial	0.33		AirFeedTel
341	buried	0.33		BurFeedTel
342	underground	0.33		UgFeedTel
343				
344	*SAI Investment, installed*			
345	*Distribution cable size*	copper feeder		
346	0	$500.00		cuSAI1
347	100	$700.00		cuSAI2
348	200	$900.00		cuSAI3
349	400	$1,100.00		cuSAI4
350	600	$1,300.00		cuSAI5
351	900	$1,500.00		cuSAI6

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
352	1200	$1,700.00		cuSAI7
353	1800	$1,900.00		cuSAI8
354	2400	$2,100.00		cuSAI9
355	3000	$2,300.00		cuSAI10
356	3600	$2,500.00		cuSAI11
357				
358	*Distribution cable size*	fiber feeder		
359	0	$2,500.00		fibSAI1
360	100	$2,700.00		fibSAI2
361	200	$2,900.00		fibSAI3
362	400	$3,100.00		fibSAI4
363	600	$3,300.00		fibSAI5
364	900	$3,500.00		fibSAI6
365	1200	$3,700.00		fibSAI7
366	1800	$3,900.00		fibSAI8
367	2400	$4,100.00		fibSAI9
368	3000	$4,300.00		fibSAI10
369	3600	$4,500.00		fibSAI11
370				
371	**Digital Loop Carrier Inputs**			
372				
373	*SLC (TR-303)*			
374	site, housing, and power per remote termi	$3,000.00		SLChouse
375	maximum lines	672	672	SLCmaxlines
376	remote terminal fill factor	0.9	0.9	SLCfill
377	common equipment investment	$42,000.00		SLCcomm
378	channel unit investment per line	$75.00		SLCchan
379	DS-0s per fiber	$2,016.00	$2,016.00	
380	Fibers per remote terminal	4	4	
381				
382	AFC			
383	site, housing, and power per remote termi	$2,500.00		AFChouse
384	maximum lines	100		AFCmaxlines
385	remote terminal fill factor	0.9		AFCfill
386	common equipment investment	$10,000.00		AFCcomm
387	channel unit investment per line	$150.00		AFCchan
388	DS-0s per fiber	2,016		
389	Fibers per remote terminal	4	4	
390				
391	Fiber feeder distance threshold, ft. (feeder	9,000		
392				
393	**Signaling Parameters**			
394				
395	STP Link Capacity	720		STPcap
396	STP Maximum Fill	0.8	0.8	STPfill
397	STP Investment, per pair, fully equipped	$5,000,000.00		STPinv
398	STP common equipment investment, per	$1,000,000.00		STPcomm
399	Link Termination, both ends	$900.00		LinkTerm
400	Signaling Link Bit Rate	56000	56000	LinkRate

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
401	Link Occupancy	0.4		LinkOcc
402	C Link Cross-Section	24		LinkCross
403	ISUP messages per interoffice BHCA	6		ISUPmsgs
404	ISUP message length, bytes	25	25	ISUPlen
405	TCAP messages per transaction	2	2	TCAPmsgs
406	TCAP message length, bytes	100	100	TCAPlen
407	Fraction of BHCA requiring TCAP	0.1		TCAPFrac
408	SCP investment per transaction per secon	$20,000.00		SCPInv
409				
410				
411	**Misc Inputs**			
412				
413	*Operator position parameters*			
414	Investment per position	$3,500.00		opinv
415	Maximum utilization per position, CCS	27		opccs
416	Operator intervention factor	10	10	opint
417	Operator position remote distance, mi.	0		opdist
418				
419	*Other*			
420	DS0/DS1 crossover	24		DS0cross
421	DS1/DS3 crossover	28		DS1cross
422				
423	Public Telephone investment per station	$1,200.00		PubInv
424				
425	**Transport Investment**			
426				
427	*Terminal Investment*			
428	Number of Fibers	24	24	termfib
429	FOT capacity, DS-3s	12	12	FOTcap
430	FOT fill	0.8	0.8	FOTfill
431	FOT, installed	$43,000.00	$43,000.00	FOTinst
432	Pigtails	$60.00	$60.00	pigs
433	Panel	$1,000.00	$1,000.00	panel
434	EF&I, per hour	$55.00	$55.00	efi
435	EF&I units	32	32	EFIU
436				
437	*Medium Investment*			
438	Fraction of structure assigned to telephone	0.33		telfrac
439	Fraction of structure shared with feeder	0.25	0.25	feedfrac
440	Distance, mi.	41	41	dist
441	Regenerator spacing, mi.	40	40	regensp
442	Regenerator investment, installed	$15,000.00	$15,000.00	regeninv
443	Fiber Cable investment per foot	$2.00	$2.00	fibinv
444	Placement	$2.00	$2.00	fibplace
445	Splice Spacing, ft.	20000	20000	splicesp
446	Splice Cost	$15.00	$15.00	splice
447	Trenching per foot	$45.00	$45.00	trench
448	Resurfacing per foot	$10.00	$10.00	resurf
449	Conduit per foot	$4.00	$4.00	condft

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
450	Number of tubes	2	2	tubes
451	Manhole investment	$5,000.00		manhinv
452	Manhole spacing	1000		manhsp
453	Buried installation per foot	$5.00	$5.00	burinst
454	Pole investment	450	450	poleinv
455	Pole spacing	150	150	polesp
456	Underground percent	35.00%		ugfrac
457	Buried percent	50.00%		burfrac
458	Aerial percent	0.15		airfrac
459				
460	**Call Attempts & DEMs**			
461				
462	*Call Attempts*			
463	Local	1		CALocal
464	IntraLata Intrastate	2		CARaRa
465	InterLata Intrastate	3		CAErRa
466	InterLata Interstate	4		CaErEr
467	Call Completion Fraction	0.70		CallComp
468				
469	*DEMs*			
470	Local	1		DEMsLocal
471	Intrastate	3		DEMsIntra
472	Interstate	5		DEMsInter
473	Local bus/res DEMs	1.1	1.1	LocalDF
474	Intrastate bus/res DEMs	2	2	IntraDF
475	Interstate bus/res DEMs	3	3	InterDF
476				
477	**Line Counts**			
478				
479	Residential	10	1,593,754	LCRes
480	Business	20	632,968	LCBus
481	Special Access	30	549,733	LCSA
482	Public	40	32,539	LCPub
483				
484	**Cable Costs**			
485	*Feeder*			
486	*Underground*			
487	Cable Size	Cost UG		
488	4200	74.25	74.25	FeedUG42
489	3600	63.75	63.75	FeedUG36
490	3000	53.25	53.25	FeedUG30
491	2400	42.75	42.75	FeedUG24
492	1800	32.25	32.25	FeedUG18
493	1200	21.75	21.75	FeedUG12
494	900	16.5	16.5	FeedUG9
495	600	11.25	11.25	FeedUG6
496	400	7.75	7.75	FeedUG4
497	200	4.25	4.25	FeedUG2
498	100	2.5	2.5	FeedUG1

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
499	*Aerial*			
500	Cable Size	Cost Aerial		
501	4200	74.25	74.25	FeedA42
502	3600	63.75	63.75	FeedA36
503	3000	53.25	53.25	FeedA30
504	2400	42.75	42.75	FeedA24
505	1800	32.25	32.25	FeedA18
506	1200	21.75	21.75	FeedA12
507	900	16.5	16.5	FeedA9
508	600	11.25	11.25	FeedA6
509	400	7.75	7.75	FeedA4
510	200	4.25	4.25	FeedA2
511	100	2.5	2.5	FeedA1
512				
513	*Distribution*			
514	*Underground*			
515	Cable Size	Cost UG		
516	3600	63.75	63.75	DistUG36
517	3000	53.25	53.25	DistUG30
518	2400	42.75	42.75	DistUG24
519	1800	32.25	32.25	DistUG18
520	1200	21.75	21.75	DistUG12
521	900	16.5	16.5	DistUG9
522	600	11.25	11.25	DistUG6
523	400	7.75	7.75	DistUG4
524	200	4.25	4.25	DistUG2
525	100	2.5	2.5	DistUG1
526	50	1.625	1.625	DistUG5
527	25	1.19	1.19	DistUG25
528	*Aerial*			
529	Cable Size	Cost Aerial		
530	3600	63.75	63.75	DistA36
531	3000	53.25	53.25	DistA30
532	2400	42.75	42.75	DistA24
533	1800	32.25	32.25	DistA18
534	1200	21.75	21.75	DistA12
535	900	16.5	16.5	DistA9
536	600	11.25	11.25	DistA6
537	400	7.75	7.75	DistA4
538	200	4.25	4.25	DistA2
539	100	2.5	2.5	DistA1
540	50	1.625	1.625	DistA5
541	25	1.19	1.19	DistA25
542				
543	*Fiber*			
544	*Underground*			
545	Cable Size	Cost UG		
546	216	13.1	13.1	FiberUG216
547	144	9.5	9.5	FiberUG144

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
548	96	7.1	7.1	FiberUG96
549	72	5.9	5.9	FiberUG72
550	60	5.3	5.3	FiberUG60
551	48	4.7	4.7	FiberUG48
552	36	4.1	4.1	FiberUG36
553	24	3.5	3.5	FiberUG24
554	18	3.2	3.2	FiberUG18
555	12	2.9	2.9	FiberUG12
556	*Aerial*			
557	Cable Size	Cost Aerial		
558	216	13.1	13.1	FiberA216
559	144	9.5	9.5	FiberA144
560	96	7.1	7.1	FiberA96
561	72	5.9	5.9	FiberA72
562	60	5.3	5.3	FiberA60
563	48	4.7	4.7	FiberA48
564	36	4.1	4.1	FiberA36
565	24	3.5	3.5	FiberA24
566	18	3.2	3.2	FiberA18
567	12	2.9	2.9	FiberA12
568				
569				
570				
571	**Fill Factors**			
572	Cable			
573	*Distribution*			
574	0-5	*0.50*		
575	5-200	*0.55*		
576	200-650	*0.60*		
577	650-850	*0.65*		
578	850-2550	*0.70*		
579	2550+	*0.75*		
580				
581	**Transport Investment**			
582	Local Direct Routes			
583	*Terminal Investment*			
584	Number of Fibers	*24*	*24*	
585	FOT capacity, DS-3s	*12*	*12*	
586	FOT fill	*0.8*	*0.8*	
587	FOT, installed	*$43,000.00*	*$43,000.00*	
588	Pigtails	*$60.00*	*$60.00*	
589	Panel	*$1,000.00*	*$1,000.00*	
590	EF&I, per hour	*$55.00*	*$55.00*	
591	EF&I units	*32*	*32*	
592				
593	*Medium Investment*			
594	Fraction of structure assigned to telephone	*0.33*		
595		*0.25*	*0.25*	
596		*41*	*41*	

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
597	Regenerator spacing, mi.	40	40	
598	Regenerator investment, installed	$15,000.00	$15,000.00	
599	Fiber Cable investment per foot	$2.00	$2.00	
600	Placement	$2.00	$2.00	
601	Splice Spacing, ft.	20000	20000	
602	Splice Cost	$15.00	$15.00	
603	Trenching per foot	$45.00	$45.00	
604	Resurfacing per foot	$10.00	$10.00	
605	Conduit per foot	$4.00	$4.00	
606	Number of tubes	2	2	
607	Manhole investment	$5,000.00		
608	Manhole spacing	1000		
609	Buried installation per foot	$5.00	$5.00	
610	Pole investment	450	450	
611	Pole spacing	150	150	
612	Underground percent	35.00%		
613	Buried percent	50.00%		
614	Aerial percent	0.15		
615				
616				
617	**Transport Investment**			
618	IntraLATA direct routes			
619	*Terminal Investment*			
620	Number of Fibers	24	24	
621	FOT capacity, DS-3s	12	12	
622	FOT fill	0.8	0.8	
623	FOT, installed	$43,000.00	$43,000.00	
624	Pigtails	$60.00	$60.00	
625	Panel	$1,000.00	$1,000.00	
626	EF&I, per hour	$55.00	$55.00	
627	EF&I units	32	32	
628				
629	*Medium Investment*			
630	Fraction of structure assigned to telephone	0.33		
631	Fraction of structure shared with feeder	0.25	0.25	
632				
633	Regenerator spacing, mi.	40	40	
634	Regenerator investment, installed	$15,000.00	$15,000.00	
635	Fiber Cable investment per foot	$2.00	$2.00	
636	Placement	$2.00	$2.00	
637	Splice Spacing, ft.	20000	20000	
638	Splice Cost	$15.00	$15.00	
639	Trenching per foot	$45.00	$45.00	
640	Resurfacing per foot	$10.00	$10.00	
641	Conduit per foot	$4.00	$4.00	
642	Number of tubes	2	2	
643	Manhole investment	$5,000.00		
644	Manhole spacing	1000		
645	Buried installation per foot	$5.00	$5.00	

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
646	Pole investment	450	450	
647	Pole spacing	150	150	
648	Underground percent	35.00%		
649	Buried percent	50.00%		
650	Aerial percent	0.15		
651				
652				
653	**Transport Investment**			
654	Access Direct Routes			
655	*Terminal Investment*			
656	Number of Fibers	24	24	
657	FOT capacity, DS-3s	12	12	
658	FOT fill	0.8	0.8	
659	FOT, installed	$43,000.00	$43,000.00	
660	Pigtails	$60.00	$60.00	
661	Panel	$1,000.00	$1,000.00	
662	EF&I, per hour	$55.00	$55.00	
663	EF&I units	32	32	
664				
665	*Medium Investment*			
666	Fraction of structure assigned to telephone	0.33		
667				
668				
669	Regenerator spacing, mi.	40	40	
670	Regenerator investment, installed	15000	15000	
671	Fiber Cable investment per foot	2	2	
672	Placement	2	2	
673	Splice Spacing, ft.	$20,000.00	$20,000.00	
674	Splice Cost	$15.00	$15.00	
675	Trenching per foot	$45.00	$45.00	
676	Resurfacing per foot	10	10	
677	Conduit per foot	$4.00	$4.00	
678	Number of tubes	$2.00	$2.00	
679	Manhole investment	$5,000.00		
680	Manhole spacing	$1,000.00		
681	Buried installation per foot	5	5	
682	Pole investment	$450.00	$450.00	
683	Pole spacing	150	150	
684	Underground percent	$0.35		
685	Buried percent	0.5		
686	Aerial percent	0.15		